198 4543K14-001

INSTRUCTIONS

UNIT CONTROLLER
CAT. NO. 1255K52 (ALL GROUPS)

INTRODUCTION AND DESCRIPTION

Unit controllers, Cat. No. 1255K52 (all groups) are normally used in automatic dispatching and telemetering systems to amplify control pulses received from external or remote devices in order to control (raise or lower) the synchronizing motor of a turbine.

The unit controller operates in conjunction with external-control reset contacts, control trip contacts, and (where applicable) signal-failure trip contacts. The unit controller provides signals for alarm lights to indicate ON or OFF control conditions, or a signal-failure condition. The controller also provides a momentary-contact operation which can be used to send a signal to a remote station to indicate that the unit controller is OFF control. The unit controller provides a trip alarm initiation in the form of a voltage pulse or contact closure, depending on the group of the particular unit controller. The unit controller can be provided for operating either split series or shunt-type governor motors with either 120-volt or 240-volt DC ratings. The unit controller consists of relays, diodes, resistors and capacitors mounted in a case whose dimensions are shown in Fig. 1.

Note: The operating features of any unit controller can be determined by examining the schematic diagram shipped with the unit controller. It is not possible to include a copy of the schematic diagrams for all types of unit controllers (by catalog group number); therefore, the design details which provide the operating functions are explained in the Principles of Operation section for a "typical" unit controller, and the variations in design which provide the alternative operations are also explained.

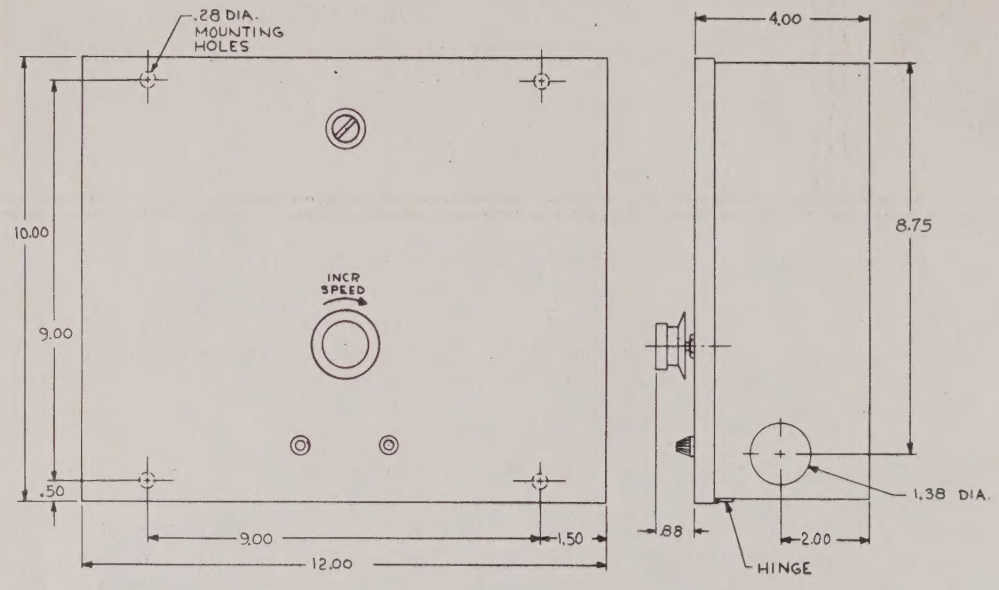
INSTALLATION

MOUNTING

Mounting dimensions for a typical unit controller are shown in Fig. 1 (Dwg. B3145K90). If dimensions are changed by adding auxiliary components for special operating features, a diagram showing the new dimensions are shipped with the unit controller.

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the General Electric Company.

GENERAL ELECTRIC



Dwg. B3145K90, ISS 1/64

Fig. 1. Mounting dimensions, typical unit controller

CONNECTIONS

Fig. 2 (Dwg. B2640K84) is an external connection diagram for a typical unit controller. External-connection diagrams are shipped with each unit controller, or external and/or interconnection diagrams for the unit controller used in a system are shipped as a part of system requirements.

OPERATION

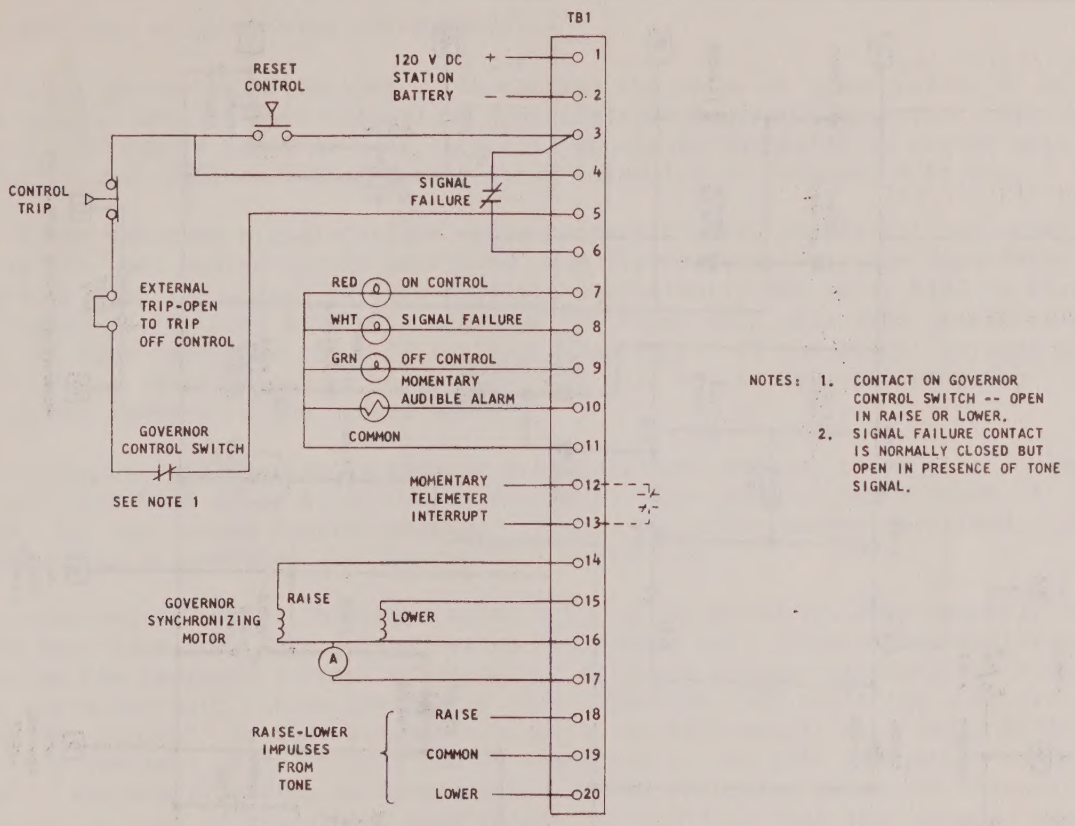
The operation of the unit controller is completely automatic once it is placed in operation by the momentary closing of the CONTROL RESET pushbutton.

PRINCIPLES OF OPERATION

This section is provided to assist in understanding what occurs within the unit controller when it is placed in operation. It is also provided to assist in isolating faulty components if troublesome operation occurs.

References are made in this section to component designations shown in Fig. 3, (Dwg. C3069K32), which is a schematic diagram for a typical unit controller. (Refer to the schematic diagram shipped with the controller during trouble-shooting procedures.)

When the CONTROL RESET pushbutton is pressed, on-control relay K101 is energized and sealed in through its own contacts and the contacts of thermal-time-delay relay K107, long-pulse-detector relay K104 and the CONTROL TRIP pushbutton.



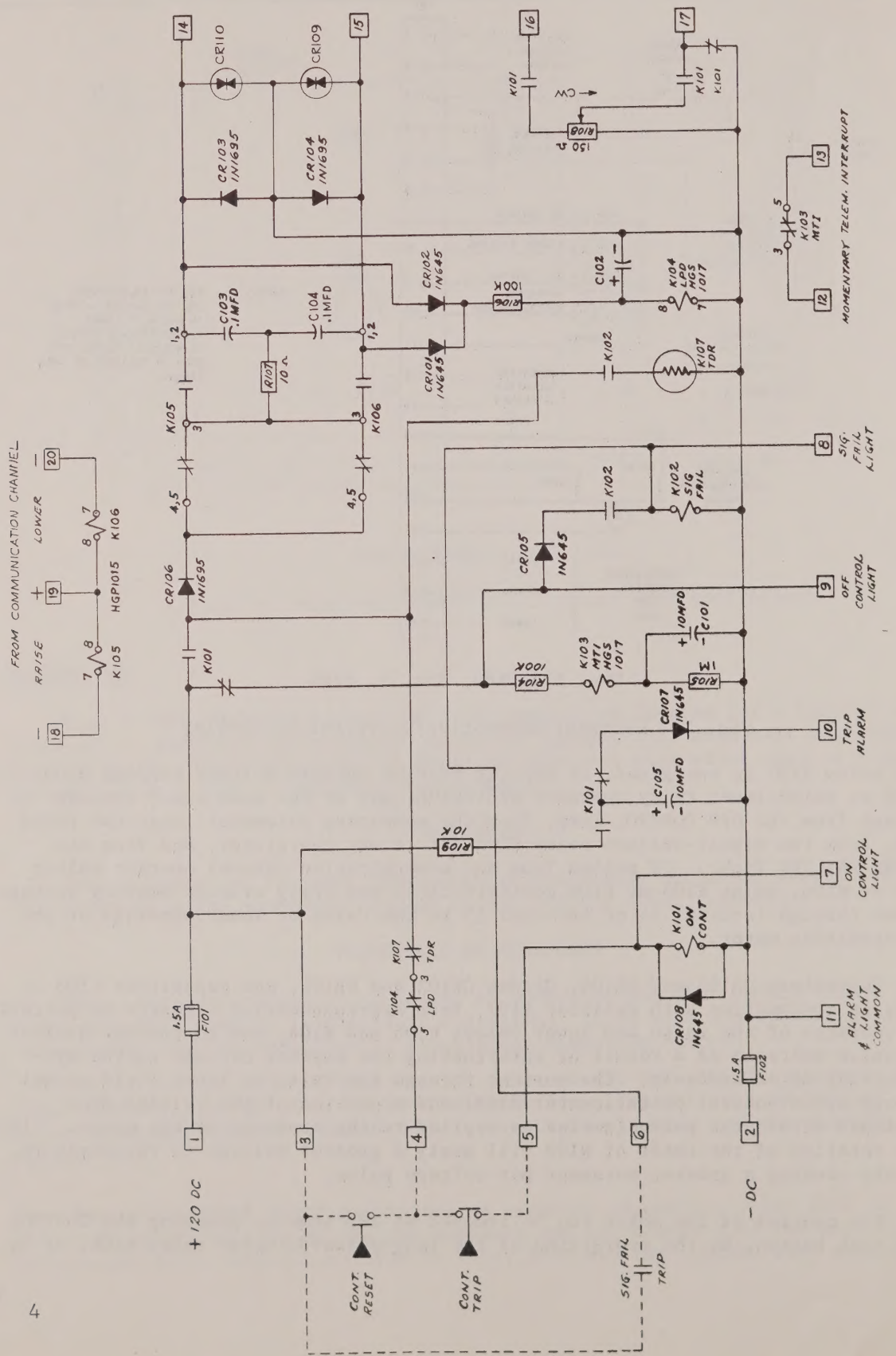
Dwg. B2640K84, Rev. A, 8/64

Fig. 2. External connections, typical controller

When relay K101 is energized, it applies station battery boltage through diode CR106 to raise/lower relay contacts K105/K106, and at the same time, removes voltage from the OFF CONTROL lamp, from the momentary telemeter interrupt relay K103, from the signal-failure relay K102 (if it was energized), and from the SIGNAL FAILURE light. If pulses from the communication channel operate relays K105 or K106, relay K105 or K106 contacts close and apply station battery voltage pulses through terminal 14 or terminal 15 to the raise or lower windings of the synchronizing motor.

Thyrectors CR108 and CR109, diodes CR103 and CR104, and capacitors C103 or C104, in conjunction with resistor R107, form arc-suppression circuits to protect the contacts of the raise and lower relays K105 and K106, and to protect against excessive voltages as a result of interrupting the current circuit to the synchronizing motor suddenly. The current through the raise or lower field passes through speed-control potentiometer R108, and a portion of the voltage drop developed across the potentiometer is applied to the armature of the motor. Clockwise rotation of the shaft of R108 will apply a greater voltage to the armature, thereby causing a greater movement per voltage pulse.

The control of the motor can be removed at any time by pressing the CONTROL TRIP push button, by the energizing of the long-pulse-detector relay K104, or by



Dwg. C3069K32 Sh 1, Rev. C, 9/64

Fig. 3. Schematic diagram, typical unit controller

the energizing of time-delay relay K107.

If the transmission channel which carries the raise or lower pulses is an audio-tone or carrier-type channel, a tone-pressure or carrier-presence relay may be used. If such a relay is used, its coil should be connected in series with the external signal-failure relay contact shown connected to terminal 6 in Fig. 3.

If the external signal-failure relay contact closes, signal-failure relay K102 in the unit controller is energized, and its contacts energize time-delay relay K107. If the signal failure persists sufficiently for relay K107 to time out, "on-control" relay K101 will drop out and relay K102 will seal itself in by means of diode CR105 and the K102 sealing-in contact. If the signal returns to normal before the time-out of relay K107, the unit controller will stay "on" control and operate in the normal manner.

Long-pulse-detector relay K104 is a time-delayed pick-up relay with a time constant that will allow it to become energized if a raise or lower pulse is longer than one second (approximately). When relay K104 becomes energized, its contacts will de-energize the "on-control" relay K101.

Momentary telemeter interrupt relay K103 is energized for approximately one second each time that "on-control" relay K101 drops out. This is accomplished by utilizing the charging current of capacitor C101 and current-limiting resistor R104. Resistor R105 bleeds the charge from capacitor C101 while the unit controller is "on control" so that a momentary operation will result when relay K101 drops out. The contacts of relay K103 can be connected to the unit generation telemeter channel, thereby providing an interruption of the returning telemeter channel which can be used to signal the Load Dispatcher's Office that something is wrong with the channel, or with the unit controller, or that the Station Operator has deliberately taken the machine off control.

In some system applications, the contacts of relay K101 are used to provide a voltage pulse to an external trip-alarm relay (through terminal 10), while in other applications the contacts are used dry (without voltage).

When the unit controller is used for operation of shunt-type motors, the contacts of relay K105 and K106 are re-arranged to operate as a reversing switch. For such an application, it is expected that the field of the shunt-type motor will be permanently energized by the station battery, and that the armature will be connected in a reversing manner through the governor-motor rheostat to the station battery. The other components in the unit controller used for shunt-type motor operation operate in the same manner as described above for the split-series type of operation.

MAINTENANCE

The unit controller requires no periodic maintenance procedures.

An understanding of the sequence of component operations (which can be gained by reading the foregoing Principles of Operation section) will assist in locating any faulty components during trouble-shooting procedures. Standard electronic and electrical trouble-shooting practices should be used to isolate faulty components if troublesome operation occurs; that is, check for sticking relay con-

tacts, open relay coils, open circuits, resistance values indicated on the applicable schematic diagram, circuit continuity, etc.

RECOMMENDED SPARE PARTS

It is recommended that the following parts be obtained as spares. If not available locally, they can be ordered through the nearest General Electric sales office. When ordering the parts, be sure to include a complete description of the part by name and catalog number and the complete catalog number of the unit controller in which it is to be used.

Quantity*	Description (For 120V Groups)	G-E Cat. No.
2	Diode, Type 1N645 (See Note 1)	6705K90 P010
2	Diode, Type 1N1695	6776K10 P026
2	Diode, G-E Co., 6RS20SP4B4	6704K90 P004
1	Relay; Potter Brumfield, Cat. GA17D (110V)	6107K90 P126
1	Relay; C.P. Clare Co., Cat. No. HGS-1017	6107K95 P003
1	Relay; Amperite, Cat. No. 115C15T(See Note2)	6118K41 P006
1	Relay, C.P. Clare Co., Cat. No. HGP-1015	6107K40 P006

*The quantities in this column are for all unit controllers at one station (several are usually used for one station).

NOTE 1: Not used in some groups.

NOTE 2: In 115C15T the 15 indicates time – delay in seconds and may be different in some groups i.e. 115C6DT.

INSTRUMENT DEPARTMENT
GENERAL ELECTRIC
WEST LYNN, MASS.

MP MASTER
MA32665

Printed in U.S.A.